



## **Frequently Asked Questions about *Naegleria fowleri***

### **What is *Naegleria fowleri*?**

*Naegleria fowleri* is a thermophilic (warmth loving) amoeba that occurs naturally in the environment worldwide.

### **Where is *Naegleria fowleri* found?**

*Naegleria fowleri* is found in warm bodies of fresh water, such as ponds, lakes, rivers, and hot springs. It is also found in soil, near warm water discharges of industrial plants, and minimally chlorinated swimming pools.

### **Can *Naegleria fowleri* infect humans?**

Although it is rare, *Naegleria fowleri* infections can occur when amoeba-containing water forcefully enters the nose while the person is swimming or diving. The amoeba then reaches the brain and spinal cord via the olfactory nerve. An infection with *Naegleria fowleri* causes the disease known as primary amoebic meningoencephalitis (PAM). PAM is an inflammation of the brain, the lining of the brain, and the spinal cord which leads to the destruction of brain tissue.

### **How common is *Naegleria fowleri* infection?**

Infection in humans from *Naegleria fowleri* is very rare. Only 35 deaths due to this infection have been documented in the U.S. between the years 1979-2002. One of these deaths was in Virginia.

### **When is *Naegleria fowleri* infection most likely to occur?**

Infection with *Naegleria fowleri* is most common during the dry, summer months when the temperature is above 80 degrees Fahrenheit, the water is warm, and water levels are low.

### **What are the signs and symptoms of a *Naegleria fowleri* infection?**

*Naegleria fowleri* infection causes an acute, usually fatal, central nervous system disease commonly referred to as PAM. Symptoms of PAM occur one day to two weeks after exposure and include headache, fever, nausea and vomiting, loss of appetite, stiff neck, lack of attention to people and surroundings, loss of balance and bodily control, hallucinations, seizures, and coma. The disease progresses rapidly and infection usually results in death within three to seven days after the onset of symptoms.

### **Can *Naegleria fowleri* infection be spread from person to person?**

No. *Naegleria fowleri* infection does not spread from person to person contact.

### **What treatments are available for PAM caused by a *Naegleria fowleri* infection?**

Several drugs have been found to be effective against *Naegleria fowleri* infection in the laboratory. However, the effectiveness of these drugs used to treat infected persons is unclear since most infections have been fatal. Amphotericin B has been successfully used in some cases to treat PAM caused by *Naegleria fowleri*.

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### **Can I contract *Naegleria fowleri* from a swimming pool or hot tub?**

No, as long as the pool or hot tub is properly cleaned, maintained and chlorinated. Chlorine rapidly kills the amoebae.

### **How does the risk of *Naegleria fowleri* infection compare with other common risks?**

The risk of contracting *Naegleria fowleri* infection is very low. There has been only one reported death due to PAM in Virginia between the years 1979 and 2002. By comparison, during that period, there have been 49 deaths in Virginia due to being struck by lightning and 548 deaths due to recreation-related drowning.

### **What does the Virginia Department of Health (VDH) recommend to prevent infection from *Naegleria fowleri*?**

To help prevent infection from *Naegleria fowleri*:

- Consider bodies of water that have a temperature exceeding 104 degrees Fahrenheit unsafe for recreational activities due to the effects of heat alone.
- Avoid swimming, jumping, or diving into bodies of water when water temperatures are high (above 95 degrees Fahrenheit), especially when the water levels are low.
- When diving or jumping into bodies of water, hold your nose shut or use a nose plug or clip to prevent water from being forced up into the nasal passages.
- While swimming, try to hold your head above the surface of the water and avoid ingesting or inhaling water.
- Avoid digging in or stirring up the sediment while swimming in shallow waters.
- Avoid prolonged immersion in warm waters if diagnosed with spinal cord or peripheral nerve disorder.

### **Is there a medical test to determine if one is infected with *Naegleria fowleri*?**

A sample of cerebrospinal fluid (CSF) can be taken and the fluid can be tested for the presence of *Naegleria fowleri* organisms.

### **At what levels does *Naegleria fowleri* cause infection?**

It is unknown at what levels *Naegleria fowleri* causes infection. It has been suggested that a density of 100 organisms of *Naegleria fowleri* per liter of water may present an immediate risk of infection.

### **Are there any standards or guidelines for *Naegleria fowleri* levels in water?**

Currently there are no public health standards or guidelines for *Naegleria fowleri* for drinking water or recreational water in the United States. The government of Australia has established an action level of 2 *Naegleria fowleri* organisms per liter (or detection of the organism in a 500 milliliter sample) for drinking water sources. French health officials have set a maximum level of 100 *Naegleria fowleri* organisms per liter of water, not to be exceeded in water sources where human exposure is possible.

### **Where can my physician or I get more information on *Naegleria fowleri*?**

Virginia Department of Health, Public Health Toxicology, Division of Environmental Epidemiology, (804) 864-8182, or visit Web site at: [www.vdh.virginia.gov/Epidemiology/PublicHealthToxicology/](http://www.vdh.virginia.gov/Epidemiology/PublicHealthToxicology/)

The Centers for Disease Control and Prevention (CDC) has several fact sheets and resources on *Naegleria fowleri*. You may find more information on the CDC Web site at: [www.cdc.gov/ncidod/dpd/parasites/naegleria](http://www.cdc.gov/ncidod/dpd/parasites/naegleria)

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October 4, 2007